

Did Anyone Already Test What We Predicted?

A Cross-Validation of VCP Against Independent Metacognition Data

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The question

The VCP framework claims that its r parameter — self-modeling capacity — should predict how well an animal performs on metacognition tests. Specifically: animals with higher r should be better at recognizing when they don't know the answer and declining to guess. This is measurable. It has been measured — in bees, rats, pigeons, and crows. But no one has measured it in cephalopods.

In 2023, a team at East China Normal University published a meta-analysis that collected every published opt-out experiment on non-primate animals. They found data on four species. They found zero data on any cephalopod. And they found something else that turns out to be directly relevant to VCP.

What the meta-analysis showed

The meta-analysis (Qu et al., 2023, *Frontiers in Ethology*) aggregated data from 11 studies covering 55 individual animals. The key metric is the opt-out rate: how much more often an animal declines to answer on difficult trials compared to easy trials. A higher opt-out rate means the animal is better at knowing what it doesn't know.

The results, by species: honeybees showed an opt-out differential of 0.131 — modest but statistically significant. Rats scored 0.290 and pigeons 0.295 — both substantially higher. Large-billed crows scored 0.380 — the highest in the dataset.

VCP assigns these species the following self-modeling values: bee $r=0.471$ (measured), rat $r=0.380$ (estimated), corvid $r=0.677$ (measured). If r predicts opt-out performance, the ordering should be: crow highest, then bee, then rat.

What matched

The crow, with the highest VCP r value in the comparison, showed the strongest metacognitive signal — an opt-out differential 2.9 times larger than the bee's. This is exactly what VCP predicts: higher self-modeling capacity means sharper uncertainty discrimination.

In 2025, a new study by Schnell, Farndale Wright and Clayton tested Eurasian jays — members of the corvid family — in an uncertainty monitoring task. Three of seven jays opted out more on difficult trials. This is the first time any corvid has shown prospective metacognitive evidence (knowing before answering that you might be wrong), not just retrospective (knowing after answering that you might have been wrong). VCP's corvid $r=0.677$ predicted exactly this kind of performance.

What did not match

The rat scored higher than the bee on opt-out performance (0.290 vs. 0.131), but VCP places the rat lower on the r -axis (0.380 vs. 0.471). This is a discrepancy.

The discrepancy has documented explanations. The bee and rat experiments used different sensory modalities (vision vs. sound/smell), and the meta-analysis confirmed that task domain is a statistically significant moderator of performance. Rats received far more training than bees, which can inflate opt-out rates. And the rat metacognition data is itself contested: the original authors' own follow-up study produced mixed results, and a 2019 review of a decade of rat metacognition research documented persistent methodological difficulties.

These explanations do not make the discrepancy disappear. They contextualize it. The honest conclusion is: either VCP underestimates r for the rat, or opt-out rate is not a clean proxy for self-modeling across different paradigms, or both. This is a refinement question, not a falsification.

The cephalopod gap — confirmed

The meta-analysis searched systematically for every opt-out experiment on non-primate animals through October 2020. It found zero studies on any cephalopod species. Not *Sepia*, not octopus, not squid. The gap that VCP's central prediction was designed to address is now confirmed by an independent meta-analysis: nobody has run this experiment.

VCP's prediction remains on record: *Sepia officinalis*, opt-out rate on difficult trials, approximately 0.836 (bee baseline: 0.520). The prediction was generated before the meta-analysis was found. It awaits the experiment.

One more finding — species does not matter

The meta-analysis found that species was not a statistically significant moderator of metacognitive performance across the four tested species ($p=0.944$). Rats, pigeons, crows, and bees do not differ as groups once other factors are accounted for. This is independently consistent with the central claim of VCP: the form of consciousness is determined by the configuration of relational structure, not by species membership. Different individuals of different species can show comparable metacognitive performance if their structural configuration is comparable.

What this means for VCP

This cross-validation is partial. Two of three ordering tests are confirmed, one shows a discrepancy. The cephalopod gap is confirmed. An independent species (pigeon) falls in the predicted range. New corvid data is consistent.

The framework is not proven. But it is also not falsified. The data from independent researchers, collected for entirely different purposes, are more consistent with VCP's predictions than not. And the one discrepancy points to a specific, investigable question: is the rat's self-modeling capacity higher than VCP currently estimates?

The central prediction — *Sepia officinalis* opt-out at approximately 0.836 — remains untested and unchallenged. When it is tested, the framework will either hold or require revision. Until then, the cross-validation suggests that the r-axis is pointing in the right direction.

Sources

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This is a purely mathematical document. VCP measures structural conditions that may be necessary for what we call conscious experience. No claims are made about consciousness as a substance.

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